and science, the office of sub-dean has been created to provide greater facilities for giving students advice. The organisation of the arrangements for post-graduate courses and for research has been improved. The report contains lists of original papers that have been issued during the past year. The activity of the department of applied mathematics, under Prof. Karl Pearson, including the Galton Laboratory for National Eugenics, is marked by the issue of twenty-seven publications, and that of the department of chemistry, under Sir William Ramsay and Prof. J. Norman Collie, by the publication of forty original papers. The report closes with a summary of the urgent needs of the college. The need for new buildings for the department of chemistry, at a cost of about 70,000*l.*, is placed in the forefront. The Chancellor, the Earl of Rosebery, has intimated his willingness to subscribe 1000*l.* to a fund for the erection of new chemical laboratories. The expenditure for the year was 53,535*l.*

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, December 10, 1908.—"The Rotation of the Electric Arc in a Radial Magnetic Field." By J. **Nicol.** Communicated by Prof. H. A. Wilson, F.R.S.

It is well known that the electric arc is deflected by a transverse magnetic field. If the electrodes are tubular and the field is radial, spreading from an iron rod lying along the axis of the electrodes, the arc will travel round these continuously. If k_1 and k_2 are the velocities, due to unit electric force, of the ions carrying the charge, the transverse velocity of the arc is $k_1 k_2 \mathrm{HX}$, so that a measurement of this velocity will give the product $k_1 k_2$.

The measurement was made by placing a slit in front of the arc and allowing the light passing through this to fall on a rotating mirror, which reflected it into a photographic camera. The axis of rotation of the mirror almost coincided with the normal to its surface, and this caused the image of a point source to be a small circle. As the slit was only illuminated intermittently (once during each revolution of the arc) the image on the plate consisted of a number of dots arranged round a circle. Counting these enabled the velocity of the arc to be determined.

Copper arcs 1·8–3·6 mm. long, carrying currents from 2–9 amperes, were used. The magnetic field varied from 35–140 C.G.S. units, and the resulting arc velocities from 200–1100 cm. per sec.

The results of the experiments led to the formula

$$v = \mathrm{H}(2{\cdot}55 + 0{\cdot}74\, i)$$

connecting the velocity with the magnetic force and arc current. The values deduced for $k_1 k_2$ lie between $0{\cdot}53 \times 10^7$ cm. per sec. per volt per cm. for a two-ampere arc and $1{\cdot}5 \times 10^7$ for nine amperes.

Langevin has given an expression for k in terms of the mean free path, and the agitation velocity of the particle $k = e\lambda / mu$.

This gives k for a corpuscle $1{\cdot}83 \times 10^4$, and this, combined with the experimental result 10^7 for $k_1 k_2$, gives $5{\cdot}5 \times 10^2$ as the velocity of the positive ion. Since mu^2 is the same for all gases, Langevin's expression shows that $k \propto 1/\sqrt{m}$. Hence in the arc the positive ion is 900 times as heavy as a corpuscle. This mass is about the same as that found by Sir J. J. Thomson for the positive ions in the Kanalstrahlen, but much less than that of the atoms (Cu, N, or O) present in the arc.

February 11.—Sir Archibald Geikie, K.C.B., president, in the chair.—The nerves of the atrio-ventricular bundle: J. Gordon **Wilson.** In the introduction the author refers to the discovery of this muscular bundle and its function by Gaskell, also to the valuable work of his and the important research of Tawara upon the structure of this bundle. He points out that both Tawara and Retzer made definite statements of the existence in the bundle of nerve cells and fibres. The material used for this research was obtained from the pig, calf, and sheep; the technique employed was the methylene blue "vital" method. Conclusions:—I. Anatomically, the atrio-ventricular bundle contains, not only a special form of muscle fibre distinct from the ordinary muscle of the atrium or the ventricle, but also an important and intricate nerve pathway, in which we find:—(1) numerous ganglion cells, monopolar, bipolar, and multipolar, the processes of which may pass (*a*) to adjacent ganglion cells in the bundle, (*b*) to the muscle fibres in the bundle, and (*c*) through the muscle bundle so far as it was examined; (2) abundant nerve fibres running through it in strands, the processes of which may end (*a*) in ganglion cells in the bundle, (*b*) in the muscle plexus, or pass through the part examined; (3) an intricate plexus of varicose fibrils around and in close relation to the muscle fibres of the bundle; (4) an abundant vascular supply with well-marked vasomotor nerves and sensory endings. II. Physiologically it has been shown that the atrio-ventricular band constitutes the pathway which assures the communication of the atrio-ventricular rhythm. When the bundle is sectioned or crushed, the ventricles cease momentarily to beat, though they soon regain pulsation, but with a rhythm much more slow than that of the atrium. Pathological anatomy supports this view; the allorhythmia of Stokes-Adams disease can be explained satisfactorily by lesions involving this pathway. As a result of these physiological experiments, and from these pathological conditions, it has been asserted that the contraction wave must be myogenic. To such a deduction the author's anatomical findings are opposed. They demonstrate that in these experiments and pathological conditions an important nerve pathway is equally involved with the muscle bundle.—An experimental estimation of the theory of ancestral contributions in heredity: A. D. **Darbishire.** The modern experimental study of (bi-parental) inheritance is based on the assumption that the character of an organism is determined by the potentialities existent in the germ cells which produce it, and not by the nature of the parents of that organism or of its more remote ancestors. In other words, according to the former view, the attempt to predict the result of a given mating must be based on some theory as to the characters existent potentially in the germ cells of the two individuals mated, and the characters of the parents themselves and of the remoter ancestry may be left out of account altogether in the attempt to make this prediction. The present paper gives an account of an experiment designed to decide, in regard to a particular character, between these two fundamentally different theories. The result of a cross between a yellow-seeded pea and a green-seeded pea, both of pure race, is already well known. All the first generation (F_1) are yellow, and 25 per cent. of the next generation (F_2), produced by mating these yellow hybrids *inter se*, are green, the rest being yellow. These "extracted" greens, as they are called, are said to be produced, by the yellow hybrids, in the same proportion, in each successive generation (F_3, F_4, . . . &c.), according to a scheme which it is not necessary to give here. An extracted green in F_5, therefore, has a great "weight" of yellow ancestry behind it, inasmuch as no green appears in that ancestry nearer than the great-great-great-grandparental generation, whilst behind that half the ancestors are yellow and half green. The author has made a number of crosses between pure yellow strains and extracted greens in F_5. All the (F_1) hybrids thus raised were yellow, as might have been expected. With regard to the next generation, however, it is evident that if there is any truth in the view that the characters of the parents and ancestors play any part in determining the composition of a given generation, *less* than 25 per cent. green should occur in F_2 from this cross. No such result is obtained. The proportion of greens in F_2 is 24·88 per cent., the number of greens being 34,792 and of yellows 105,045. The probable error of the percentage is $\pm 0{\cdot}078$. The actual deviation from the 25 per cent. expected, namely, 0·12 per cent., is not twice the probable error, and is therefore certainly not significant.—The determination of a coefficient by which the rate of diffusion of stain and other substances into living cells can be measured, and by which bacteria and other cells may be differentiated: H. C. **Ross.** When fresh blood is spread upon a film of agar jelly which contains Unna's stain and certain salts, the stain diffuses into the living cells, and the rapidity of diffusion depends on certain factors. It is accelerated by heat, and, of course, by time. If the jelly is alkaline, diffusion is also accelerated. Acids and neutral salts delay it. It has been found that when one class of cell stains on a given agar film, other classes do not. By slightly altering the constitution of the agar, *i.e.* by adding more alkali, acid, or salts, or by trying a different temperature, &c., that class of cell which previously refused to stain will now absorb it. It has also been found that bacteria and other cells are subject to the same conditions, and by this means it has been possible to differentiate them by their rate or coefficient of diffusion. A simple method is given for the arrangement of the agar jelly; and by measuring in units the factors, heat, alkalies, acids, salts, and time, the coefficients of diffusion can be expressed in numerals with the aid of a simple equation, the staining of the nucleus, or the cytoplasm in unnucleated cells, being the moment by which the coefficient is determined. The staining of the nucleus is coincident with death. Conversely, when the coefficient of diffusion of a cell is known, the equation indicates how to arrange an agar film so as to cause staining of the cell in a given time at a given temperature. Examples are given, and among them is one which shows that the rate of diffusion of substances other than stains also appears to depend on the coefficient of diffusion of the cells. In addition there is a summary, and some suggestions are made as to possible practical applications of the subject considered in the paper.—The origin and destiny of cholesterol in the animal organism, part iii., the absorption of cholesterol in the intestine and its appearance in the blood: C. **Dorée** and J. A. **Gardner.** The authors, as a result of experiments already communicated to the society and a consideration of the work of previous observers, have been led, in the present paper, to formulate the following working hypothesis as to the origin and destiny of cholesterol in the animal organism:—(1) Cholesterol is a constant constituent of all cells, and when these cells are broken down the cholesterol is not excreted as a waste product, but is utilised in the formation of new cells. (2) A function of the liver is to break down dead cells, *e.g.* blood corpuscles, and to eliminate their cholesterol in the bile. (3) After the bile has been poured into the intestine in the process of digestion, the cholesterol is re-absorbed, probably in the form of esters, along with the bile salts, and carried by the blood to the various centres and tissues for re-incorporation into the constitution of new cells. (4) Cholesterol is probably not synthesised in the animal body, and any wastage of cholesterol is replaced by direct absorption from the food. With the view of testing this hypothesis, the experiments detailed in the communication were carried out. On feeding rabbits on food freed from cholesterol or phytosterol, no cholesterol could be found in the fæces. When, however, weighed quantities of cholesterol were added to this food, a certain proportion was always absorbed. Analyses of the blood of these animals showed an increase in the cholesterol content in the case of animals fed with cholesterol compared with those without cholesterol. Similar experiments carried out on dogs showed that cholesterol was also absorbed from their food.—The origin and destiny of cholesterol in the animal organism, part iv., the cholesterol content of eggs and chicks: G. W. **Ellis** and J. A. **Gardner.** This paper contains an account of a number of experiments carried out with the view of obtaining evidence of the truth of the hypothesis recently advanced, that cholesterol is strictly conserved in the animal organism, and that it is not synthesised by the animal, but taken into its organism as food, at any rate in the growing animal. The experiments detailed in this paper consist of a number of estimations of cholesterol in the total unsaponifiable matter obtained from hens' eggs and newly hatched chicks. The estimations were carried out with the greatest possible accuracy, and the results leave no doubt that there is no increase in cholesterol during the change of the ovum into the complex aggregate of cells constituting the newly hatched chick. The results seem to show a slightly lower percentage of cholesterol in the chick than in the egg, but this difference may be due to experimental difficulties in extracting all the cholesterol from the tissues of the chick. The average percentages of cholesterol in eggs and chicks are given in the accompanying table. The percentages of cholesterol in the chicks are given in terms of the weights of the original eggs:—

	Per cent.
6 eggs, analysed together	0·4896
6 eggs, analysed separately	0·4121
Average	0·4508
6 chicks, analysed together	0·4677
6 chicks, analysed separately	0·3633
Average	0·4155
Difference	0·0353

February 18.—Sir Archibald Geikie, K.C.B., president, in the chair.—The osmotic pressures of solutions of calcium ferrocyanide, part ii., weak solutions: the Earl of **Berkeley,** E. G. J. **Hartley,** and J. **Stephenson.** This communication records the observed equilibrium osmotic pressures from 25 to 5 atmospheres, and also the electric conductivities of the more dilute solutions; it is shown that to bring the two sets of observations into accord it is necessary to assume that the salt molecule is associated when in solution. Similar remarks apply to strontium ferrocyanide, and are not inconsistent with the data found for the potassium salt.—The spontaneous crystallisation of monochloracetic acid and its mixtures with naphthalene: Dr. H. A. **Miers** and Miss F. **Isaac.** In this investigation three different modifications (α, β, and γ) of monochloracetic acid are described, and the transformations from one modification to another. The behaviour of aqueous solutions of monochloracetic acid was investigated as the solutions cooled by means of observations on their refractive indices. These experiments lead to the establishment of three supersolubility curves separating the metastable and labile regions, corresponding to the three modifications of the acid. These supersolubility curves have also been verified by an independent method. Aqueous solutions of monochloracetic acid of various concentrations were enclosed in sealed glass tubes and heated until the crystals had completely dissolved. The temperatures at which the solutions re-crystallised spontaneously as either α, β, or γ crystals were found to agree with the temperatures at which the corresponding solutions passed from the metastable to the labile state as determined by the previous experiments. The three solubility curves for the three modifications of monochloracetic acid have also been obtained. The second part of the paper deals with mixtures of monochloracetic acid and naphthalene. These substances Cady describes as forming mixed crystals and possessing a minimum, or eutectic, freezing point (*Journ. Phys. Chem.*, 1899, iii., 127). In a long series of experiments, however, of which an account is given, there has never been any indication of the formation of mixed crystals. The melting and freezing points of a large number of mixtures were carefully determined, but in no case was there found to be any appreciable difference between these points. The study of the crystallisation of these mixtures therefore yields results similar to those obtained for salol and betol (Proc. Roy. Soc., A, lxxix., 1907), a new feature being introduced by the existence of the three modifications of monochloracetic acid. Four solubility curves have been traced, *i.e.* the solubility curve for naphthalene in monochloracetic acid, and the three solubility curves for the modifications α, β, and γ of monochloracetic acid in naphthalene. Each of the latter meets the naphthalene solubility curve in a eutectic point, thus giving three eutectic points. Similarly, four supersolubility curves for these mixtures have been determined, giving the temperatures at which naphthalene and the three modifications of the acid crystallise spontaneously. These curves intersect in three hypertectic points, showing the highest temperature at which naphthalene and each modification of the acid respectively can crystallise spontaneously together. The four solubility and four supersolubility curves when plotted on a diagram show that in a mixture of two substances, of which one exists in three modifications, eight freezing points may be exhibited by a cooling mixture.—An apparatus for measurements of the defining power of objectives: J. de Graaff **Hunter.** The general principle of the method of measurement employed may be stated as follows. The image of a knife-edge formed by a photographic lens, when viewed with a microscope, will no longer appear as a sharp edge; the illumination of the bright portion of the field will only gradually fade away to complete darkness at some position within

the line ideally representing the true image of the edge. The object aimed at is to measure the actual intensity of illumination in the image at different distances on either side of this ideal line. The variation in the illumination with the distance is, of course, very rapid, and the total distance over which it is necessary to carry the measurements is in general extremely small. To isolate the strip parallel to the knife-edge, the illumination of which is to be measured, a narrow slit is placed in the focal plane of the microscope objective, and is thus magnified by the eye-piece. To measure the intensity of the illumination seen through this slit—*i.e.* the illumination along a line parallel to the ideal image of the knife-edge—a special mechanism is employed, whereby this image is made to alternate with light from a constant source, which, however, can be varied in a measurable proportion, so as to become of equal intensity with the illumination to be measured. This equality is judged by the absence of "flicker" when the alternations are made to succeed one another with appropriate frequency.—Best conditions for photographic enlargement of small solid objects: A. **Mallock.** When it is desired to take an enlarged photograph of an object which is not flat, and which cannot, therefore, be in focus in all parts, the question arises as to what form of lens should be used in order to secure the best results. It is shown in the paper that if a certain minimum fineness of definition is required, say, the separation of points the distance apart of which is a_1, then, in the first place, the lens used must be capable of resolving points half this distance apart; and, secondly, that the greatest distance (b_3) of the surface from the focal plane must not exceed $a/2\alpha$, where α is the angular aperture of the lens. The resolving power of a lens being dependent on α and the wave-length, it is shown that if $a=n\lambda$, then $b=n^2\frac{1}{4}\lambda$ nearly. The best that can be done, therefore, in photographing a curved or uneven surface is to use a lens which will resolve half the least distance to be defined in the picture. If this be done, all points which are not within a distance a_1 of one another, and not more than $n^2\frac{1}{4}\lambda$ out of focus, will appear separated in the picture. On the other hand, if b is given, the least distance which will be resolved over the whole picture is $2\sqrt{(b\lambda)}$.

Zoological Society, February 16.—Mr. F. Gillett, vice-president, in the chair.—Fauna of the Cocos-Keeling Atoll: Dr. F. **Wood-Jones.** The work was based on collections made by the author during a stay of fifteen months in 1905 and 1906, and in the case of most orders was believed to be fairly complete.—The anatomy of certain Ungulata, including Tapirus, Hyrax, and Antilocapra: F. E. **Beddard.**—Le Rhinocéros Blanc du Soudan (*Rhinoceros simus cottoni*): Dr. E. L. **Trouessart.**

Institution of Mining and Metallurgy, February 18.—Mr. Alfred James, president, in the chair.—Adjourned discussion on a theory of volcanic action and ore deposits, their nature and cause: Hiram W. **Hixon.**—The following papers were also discussed:—An instance of secondary impoverishment: H. H. **Knox.** This paper dealt with deposits on the private estates of Kishtim, in the government of Perm, Russia, in which are occurrences of unoxidised iron sulphides, which have been leached of their copper contents. The mines particularly dealt with were a group comprising the Tissoff, Koniukhoff, and Smirnoff lodes in the Soimonorsk Valley.—"Shrinkage" stoping in Western Australia: F. Percy **Rolfe.** A description of the method of stoping used at the Lake View Consols Gold Mine, and a review of the advantages and disadvantages of the method as compared with the common system of stoping adopted in Western Australia by means of "mullock" or "filled" stopes. The reasons for utilising "shrinkage" stoping in this particular mine were stated, and the details of the method fully explained.

PARIS.

Academy of Sciences, February 22.—M. Émile Picard in the chair.—Hertzian waves and Fredholm's equation: H. **Poincaré.** It is shown that several problems relating to Hertzian waves can be reduced to the integration of a Fredholm's equation.—The sex in sea-urchins obtained by experimental parthenogenesis: Yves **Delage.** Two sea-urchins, which had survived their metamorphosis sixteen months, were accidentally killed by a change in their conditions of life. The determination of their sex showed that one was certainly, and the other probably, male. From this the conclusion is drawn that sea-urchins produced by experimental parthenogenesis can be raised to the adult state, characterised by the presence of the sexual elements, and that males can be thus obtained.—Electrical discharges in intense magnetic fields: M. **Gouy.**—The principles of intrinsic projective geometry: A. **Demoulin.**—Some figures determined by the infinitely near elements of a skew curve: B. **Hostinsky.**—The application of the generalised theorem of Jacobi to the problem of Jacobi-Lie: W. **Stekloff.**—The search for roots of certain numerical transcendental equations: R. **de Montessus.**—The statical graphics of the aëroplane: Léon **Lecornu.**—The force and power of propulsion of aërial helices: René **Arnoux.**—The thermal effects of a musical arc; the probable fusion of carbon: M. **La Rosa.** The amount of energy in a singing arc is much greater than in an ordinary arc possessing self-induction, and hence should possess a much higher temperature than the latter. By the action of a singing arc on sugar charcoal masses of graphite have been obtained possessing such firmness and tenacity as to suggest that the charcoal had been fused.—The constitution of subterranean telephone circuits in large towns: M. **Devaux-Charbonnel.** It has been known for some time that the presence of an underground section of a telephone circuit diminishes considerably the intensity of the voice, and particularly affects the distinctness of certain consonants. In the present paper a calculation is given showing the relation between a given length of air line and the corresponding length of underground cable. The most advantageous diameter of wire for the cable is also worked out, and the important advantages possessed by cables of small capacity indicated.—The existence of positive electrons in vacuum tubes: A. **Dufour.** The author has repeated the experiments of J. Becquerel on the existence of positive electrons in vacuum tubes, and has obtained the same experimental results. The author's interpretation of the experiments is, however, different from that given by M. Becquerel, and does not necessitate the assumption of the existence of positive electrons in the vacuum tube.—The atomic weight of potassium: G. D. **Hinrichs.** The author applies his methods of calculation to the recent data of V. Lenher, and concludes that the true atomic weight of potassium is 39·125.—The colour reactions of indol bodies with sugars: Julius **Gnezda.**—The chloralic acids: M. **Hanriot.** The substances obtained by combining chloral with various sugars have been submitted to oxidation; acids, which are called chloralic acids, are produced, the properties of a number of which are described.—Syntheses by means of the mixed zinc organo-metallic derivatives: E. **Blaise** and A. **Kœhler.** This general method of synthesis starts from the ester-acids of the type $CO_2Et.(CH_2)_n.CO_2H$, details being given of the best methods of preparing these acids. These are then converted into the chlorides

$$CO_2Et.(CH_2)_n.CO.Cl,$$

and then submitted to the reaction represented by the equation

$$CO_2Et.(CH_2)_n\ COCl + R.ZnI = ZnICl + CO_2Et.(CH_2)_n.CO.R.$$

Symmetrical diketones can also be obtained by a modification of the conditions, and the properties of a number of these are given.—The preparation of indazylic derivatives by means of hydrazo-orthoketones: P. **Carré.**—The nature of the cyano-compounds of Kirsch: X. **Rocques** and L. **Lévy.** The hydrocyanic acid in Kirsch two or three years old exists only partially in the free state, a part being combined with fatty derivatives of high molecular weight.—The coagulation of milk by the ferment of *Carica papaya*: C. **Gerber.**—Some new properties of the oxydases of *Russula delica*: J. **Wolff.**—The colloidal properties of starch with respect to its chemical constitution: Eugène **Fouard.** The rotatory power of a limpid solution of starch, obtained by filtration through a collodion film, is a function of the alkalinity of the liquid. As the amount of potash added is increased, the rotation tends to a limit of 141°; this figure is nearly identical with the specific rotatory power of maltose in dilute solution (140°·4). The conclusion drawn from the whole of these experiments is that starch is a unique chemical species, and is simply a condensation product of maltose.—The maltases of maize: R. **Huerre.**—The digestion of mannanes and galactanes: H. **Bierry** and J. **Giaja.**—A mould in tanning with oil: André **Piedallu.** An account of the appearance of *Monascus purpureus* in various culture media. This fungus acidifies oils, thickens, and colours them brown; it secretes an oxydase, and appears to play an important part in the preparation of chamois leather.—The composition and utilisation of the pulp from sisal hemp after removal of the fibre: A. **Hébert** and F. **Heim.**—Comparison between the commencement of the development of a perennial and annual plant: G. **André.**—A variety of organic iron in plants: P. J. **Tarbouriech** and P. **Saget.** The plant *Rumex obtusiflorus* contains the highest proportion of iron in any plant yet known, and this iron is present in a form not reacting with the ordinary reagents for iron. The iron compound, which contains carbon, hydrogen, nitrogen, phosphorus, and iron (6·36 per cent.), is extracted from the root by alcohol containing 1 per cent. of hydrochloric acid.—Concerning the anatomy of the human thymus: Henri **Rieffel** and Jacques **Le Mée.** A reply to a criticism by M. Cruchet of a former paper by the authors.—The histological structure of the seminal receptacle of *Periplaneta orientalis*: L. **Bordas.**—The dangers of chloroform. Incoagulability of the blood and necrosis of the liver following after chloroform anæsthesia: M. **Doyon.**—The sterilisation of potable water by means of the quartz mercury vapour lamp: Jules **Courmont** and Th. **Nogier.** Potable water containing Eberth's bacillus or *Coli communis* is sterilised in one minute within a range of 30 cm. from the lamp.—Measurements in d'Arsonvalisation: E. **Doumer.**—The treatment of radiodermatitis by the high-frequency spark: M. de Keating **Hort.**—Diaphylactic centres: Pierre **Bonnier.**—The sense of orientation and topographical memory in *Patella vulgata*: H. **Piéron.**—The study of the geological distribution of the Bryozoa: Ferdinand **Canu.**

DIARY OF SOCIETIES.

THURSDAY, MARCH 4.

ROYAL SOCIETY, at 4.30.—On the Presence of Hæm-agglutinins, Hæm-opsonins, and Hæmolysins in the Blood obtained from Infectious and Non-infectious Diseases in Man (Second Report): L. S. Dudgeon.—The Action on Glucosides by Bacteria of the Acid-fast Group, with a New Method of isolating Human Tubercle Bacilli directly from Tuberculous Material contaminated with other Micro-organisms (Preliminary Note): F. W. Twort.—The Effect of Heat upon the Electrical State of Living Tissues: Dr. A. D. Waller, F.R.S.

ROYAL INSTITUTION, at 3.—Problems of Geographical Distribution in Mexico: Dr. Hans Gadow, F.R.S.

RÖNTGEN SOCIETY, at 8.15.—Some Vacuum Tube Phenomena: A. A. Campbell Swinton.

LINNEAN SOCIETY, at 8.—A Contribution to the Montane Flora of Fiji, including Cryptogams, with Ecological Notes: Miss L. S. Gibbs.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY, at 8.—Some Commercial Aspects of the Management of Central Electricity Supply Stations: R. Borlase Matthews.

FRIDAY, MARCH 5.

GEOLOGISTS' ASSOCIATION, at 8.—On the Sections of Inferior Oolite on the Midford-Camerton Section of the Limpley Stoke Railway, Somerset: L. Richardson.—The Geology of the Paris Basin: F. Dollfus.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Slips in Railway Earthworks: E. G. L. Lovegrove.

SATURDAY, March 6.

ROYAL INSTITUTION, at 3.—Properties of Matter: Sir J. J. Thomson, F.R.S.

ESSEX FIELD CLUB, at 6 (at Essex Museum, Stratford).—Some Essex Well-sections (Part iv): W. Whitaker, F.R.S.—Remarks on a Bone Object found at Braintree, Essex, and Comparison of Similar Objects found elsewhere: Francis W. Reader.—Insect Transformations: F. Enoch.

MONDAY, MARCH 8.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Explorations in Central Asia: Dr. M. A. Stein.

ROYAL SOCIETY OF ARTS, at 8.—Modern Methods of Artificial Illumination: Leon Gaster.

TUESDAY, MARCH 9.

ROYAL INSTITUTION, at 3.—The Evolution of the Brain as an Organ of Mind: Prof. F. W. Mott, F.R.S.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—The Veddas: Dr. C. G. Seligmann.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Concrete and Masonry Dam Construction in New South Wales: L. A. B. Wade.

WEDNESDAY, MARCH 10.

GEOLOGICAL SOCIETY, at 8.—Some Notes on the Neighbourhood of Victoria Falls: Thomas Codrington.—A Contribution to the Petrography of the New Red Sandstone in the West of England: H. H. Thomas.

SOCIETY OF ARTS, at 8.—The Application of the Microscope to the Study of Metals: Walter Rosenhain.

THURSDAY, MARCH 11.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: Note on the Stability of Jacobi's Ellipsoid: Sir George H. Darwin, K.C.B., F.R.S.—On the Wave-lengths of Lines in the Secondary Spectrum of Hydrogen: H. E. Watson.—The Measurement of Dielectric Constants by the Oscillations of Ellipsoids and Cylinders in a Field of Force: Prof. W. M. Thornton.

ROYAL INSTITUTION, at 3.—Recent Advances in Agricultural Science: A. D. Hall.

MATHEMATICAL SOCIETY, at 5.30.—The Kinetic Image of a Convected Electric System in a Conducting Plane Sheet: Prof. J. Larmor.—On an Integral Equation: G. H. Hardy.—The Use of Generalised Line, Surface, and Volume Integrals in Electrodynamics: H. Bateman.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—The Dielectric Strength of Compressed Air: E. A. Watson.

FRIDAY, MARCH 12.

ROYAL INSTITUTION, at 9.—Modern Submarine Telegraphy: S. G. Brown.

PHYSICAL SOCIETY, at 8.—The Effect of Radiations on the Brush Discharge: A. E. Garrett.—On Pirani's Method of Measuring the Self-inductance of a Coil: E. C. Snow.—Exhibition of a High Potential Primary Battery: W. S. Tucker.—On the Least Moment of Inertia of an Angle Bar Section: H. S. Rowell.

MALACOLOGICAL SOCIETY, at 8.—Description of a New Species of Oliva from the Andaman Islands: F. G. Bridgman.—Notes on the Genera Cypræa and Trivia: H. O. N. Shaw.—On the Shell Mound at Sidon; On the Habitat of Certain Species of Clausilia from the Coast of Syria: Rev. H. A. Cooke.—Notes on the Species of Cyclophorus found at Hong Kong: Staff-Surgeon K. H. Jones, R.N.—On the "Conchological Illustrations," by G. B. Sowerby, jun., and the "Descriptive Catalogue of Shells," by J. E. Gray: C. Davies Sherborn.—On the Date of Issue of Sowerby's "Conchological Illustrations": H. O. N. Shaw.

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